

### **REMARKS/ARGUMENTS**

Claims 13, 15, 28, 30, 33, 37-40, 51-56 and 58-76 are pending in the Application. Applicants respectfully request reexamination and reconsideration of the application.

As required by the Examiner, pages 1 and 30 of the specification have been amended to reflect the patent numbers of related applications.

Claims 13, 15, 28, 30, 33, 37-40, 51-56 and 58-76 have been rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The drawings have been objected to under 37 CFR 1.83(a) for failing to show every feature of the invention specified in the claims. For the reasons detailed below, Applicants respectfully traverse these rejections.

Independent claim 13 recites the following elements:

*An interconnect assembly comprising:  
a semiconductor wafer comprising a plurality of dies;  
a plurality of resilient contact elements attached to said dies, said contact elements on each die disposed to electrically connect said die to an electronic component; and  
a sheet material disposed on said semiconductor wafer and comprising openings for said resilient contact elements, said sheet forming stop structures each defining a minimum separation between one of said dies and said electronic component.*

A representative example of an interconnect assembly as defined by claim 13 is shown in Fig. 9C and described on page 19, line 3 through page 20, line 6. Note that Fig. 9C is a side view representing wafer, dies, sheet with holes, etc. as required for clarity by the Examiner. Substrate 915 as shown and described may be, among other things, "*a semiconductor wafer which includes a plurality of integrated circuits*". Page 19, lines 9-10. The term "integrated circuits" in this context is well understood by those skilled in the art as synonymous with "*dies*".

A resilient contact element 911 is also shown in Fig. 9C. It is clear from the description on pages 9-10 and the descriptions on previous pages that resilient contact element 911 is not

necessarily a single element, but is merely representative of a plurality of such elements. Fig. 9C shows resilient contact element 911 attached to a semiconductor wafer die 915, but does not directly show element 911 electrically connecting the die to an electronic component. However, from the application as a whole, it is clear that the embodiment of Fig. 9C is similar in function and purpose to the embodiment shown in Fig. 6B. Fig. 6B shows interconnect assembly 601A having resilient contact elements 608 and 609 electrically connecting substrates 602 and 603. As described on page 13, line 20 through page 14, line 11, substrate 602 may be, for example, a plurality of integrated circuits on a semiconductor wafer, and substrate 603 may be part of a probe card structure or part of a package assembly. Accordingly, support for ***a plurality of resilient contact elements attached to said dies, said contact elements on each die disposed to electrically connect said die to an electronic component*** is provided in the description and drawings as shown above.

Fig. 9C also provides an example of ***a sheet material (903) disposed on said semiconductor wafer (915) and comprising openings (905, 907) for said resilient contact elements (911)***. Fig. 9C shows a side view of these elements, while Fig. 9A shows a plan view of sheet material 903 and openings 905, 907. Fig. 9A and the accompanying description on page 18, lines 11-23 indicate that the sheet material 903 can be disposed on a single IC or die, or over an entire semiconductor wafer 902. The openings (905, 907) are designed to surround at least one resilient contact element (911) as shown in Figure 9C. Page 18, lines 12-13.

***Sheet (903) forms stop structures (916) each defining a minimum separation between one of said dies (915) and said electronic component.*** This is shown in Fig. 9C and described on page 19, lines 20-23. The application is replete with other examples of stop structures, such as those shown in Figs. 6A-6D, that define a minimum separation between semiconductor dies and an electronic component.

For at least the reasons outlined above, all of the elements of independent claim 13 are supported by the application and are shown in the drawings as filed. Accordingly, Applicants respectfully submit that the 35 U.S.C. 112 rejection of claim 13 and the 37 CFR 1.83(a) objection to the drawings with respect to claim 13 are improper and should be withdrawn.

Independent claims 28 and 33 are similar to claim 13, and for the forgoing reasons the rejection of these claims and the objection to the drawings relative to these claims should also be withdrawn.

Independent claim 51 recites:

*A method for forming stop structures on a plurality of semiconductor dies, said method comprising:*

*applying a sheet to an unsingulated semiconductor wafer comprising said dies;  
forming a plurality of openings in said sheet; and*

*forming a plurality of first contact elements on said dies within said openings,  
said first contact elements having a first height relative to said dies and said sheet  
having a second height relative to said dies, said sheet comprising said stop structures  
each of which defines a minimum separation between one of said dies and another  
substrate having second contact elements which are in mechanical and electrical  
contact with said first contact elements on said one of said dies.*

As described above, the *applying a sheet* and *forming a plurality of openings* steps are fully supported by the specification and drawings. The elements of the final step of claim 51 can be seen for example in Figs. 6A and 6B. Specifically, *a plurality of first contact elements (608, 609)* are shown formed on *dies 602*. The *first contact elements (608, 609)* have a *first height* (i.e. the uncompressed height of resilient spring contacts 608, 609 measured vertically in Fig. 6A) *relative to said dies (602)*. The sheet, represented in these figures by 606 and 607, has a *second height relative to said dies (602)*. The sheet comprises *said stop structures (606, 607)* *each of which defines a minimum separation between one of said dies (602) and another substrate (603) having second contact elements (604, 605) which are in mechanical and electrical contact with said first contact elements (608, 609) on said one of said dies (602).*

For at least the reasons outlined above, all of the elements of independent claim 51 are supported by the application and are shown in the drawings as filed. Accordingly, Applicants respectfully submit that the 35 U.S.C. 112 rejection of claim 51 and the 37 CFR 1.83(a) objection to the drawings with respect to claim 51 are improper and should be withdrawn.

Claims depending from independent claims 13, 28, 33 and 51 similarly find support in the description and drawings. For example, dependant claims 15, 30, 38 and 55 recite interconnect assemblies wherein the *sheet material comprises an adhesive layer disposed to adhere one of said dies to said electronic component and a removable cover over said adhesive*

*layer.* Support for these elements can be found in Figs. 8A-8B, and on page 16, line 11 through page 18, line 10. For the forgoing reasons the rejection of these dependent claims and the objection to the drawings relative to these claims should also be withdrawn.

In view of the foregoing, Applicants submit that all of the claims are allowable and the application is in condition for allowance. If the Examiner believes that a discussion with Applicants' attorney would be helpful, the Examiner is invited to contact the undersigned at (925) 290-4031.

Respectfully submitted,

Date: February 22, 2005

By Douglas C. Limbach  
Douglas C. Limbach  
Reg. No. 35,249

FormFactor Inc.  
7005 Southfront Rd.  
Livermore, CA 94551  
Telephone: (925) 290-4000  
Fax: (925) 290-4119